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Efficacy of a Chase Boat for Electrofishing Flathead Catfish in Three Oklahoma Reservoirs

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Abstract.—Electrofishing methods employed to sample flathead catfish *Pylodictis olivaris* in reservoirs can be labor-intensive when a chase boat is used to increase sampling efficiency. During summer 1997, I compared electrofishing results with and without a chase boat on three Oklahoma reservoirs. Capture efficiency, mean number of fish netted per 3-min sample, and length-frequency distribution were similar with and without a chase boat. I recommend discontinuing the use of a chase boat for sampling flathead catfish with electrofishing in reservoirs similar to those sampled in my study.

Electrofishing is an effective technique for collecting flathead catfish *Pylodictis olivaris* (Weeks and Combs 1981; Gilliland 1988). Interest and concern for flathead catfish fisheries among Oklahoma anglers (Summers 1986) encouraged the Oklahoma Department of Wildlife Conservation (ODWC) to sample reservoir populations with electrofishing beginning in 1991. Although electrofishing is effective for sampling flathead catfish, it is labor-intensive because a chase boat is used to increase sampling efficiency. Stunned flathead catfish generally surface within 45 s after sampling is initiated and remain on the surface for 60–90 s (Hale et al. 1987; Gilliland 1988; Cunningham 1995). A chase boat may facilitate capture when several fish surface over a wide area. Typically 40–75% of stunned individuals observed are captured and the majority are netted from a chase boat (Cunningham 1995, 2000; ODWC, unpublished data). However, using a chase boat increases equipment and manpower needs because sampling trips usually require two boats and four to six people. The objective of my study was to determine if a chase boat is necessary to effectively sample flathead catfish with electrofishing in reservoirs.

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Methods

Flathead catfish were collected from Fort Gibson, Hudson, and Robert S. Kerr reservoirs, all located in the Arkansas River basin (Table 1). Major sport species are similar for all three reservoirs and include blue catfish *Ictalurus furcatus*, channel catfish *I. punctatus*, crappies *Pomoxis* spp., flathead catfish, largemouth bass *Micropterus salmoides*, and white bass *Morone chrysops*, Major forage species include gizzard shad *Dorosoma cepedianum* and bluegill *Lepomis macrochirus*. Flathead catfish were sampled by electrofishing during daytime in June 1997. Two types of boats—an electrofishing boat and a chase boat—were used during the course of this study. The electrofishing boat was a Smith-Root GPP (Smith-Root, Inc., Vancouver, Washington) mounted on an 18-ft aluminum boat, with the hull acting as the cathode and two booms with dropper cables arranged in a ring. The chase boat was an 18-ft aluminum boat. Personnel in each boat were standardized for the duration of the study and consisted of a driver and a netter.

Sampling was conducted at 20 sites per reservoir in known flathead catfish habitat, including rocky points, riprap, and steep, undercut banks (Hale et al. 1987). The electrofishing boat was held stationary 2–10 m offshore in depths ranging from 2 to 14 m (Gilliland 1988; Quinn 1988; Cunningham 1995). Water temperature ranged from 20–29°C. Two 3-min samples were collected at each site. During one of the samples, the chase boat was used to assist in locating and netting surfacing flathead catfish; during the other sample, surfacing flathead catfish were located and netted solely by personnel in the electrofishing boat. The sampling method used first at each site was randomly selected and was followed 1 week later with the other method to eliminate bias introduced by repeated electrofishing (Cross and Stott 1975).

The number of flathead catfish observed and the number and total lengths of flathead catfish netted were recorded. Capture efficiency was expressed as the percentage of fish observed that were netted,

TABLE 1.—Physical and limnological characteristics of study reservoirs. Depths are the mean and maximum depths at summer pool, and Secchi transparency is the mean midsummer Secchi disk reading.

Reservoir	Area (ha)	Depth (m)		Secchi transparency (cm)
		Mean	Maximum	
Fort Gibson	8,053	6	23.3	79
Hudson	4,411	5.6	19.5	98
Robert S. Kerr	17,010	4	16	73

TABLE 2.—Capture efficiency and catch rate of flathead catfish sampled by electrofishing with and without a chase boat on Fort Gibson, Hudson, and Robert S. Kerr reservoirs, Oklahoma, 1997. Included are numbers of flathead catfish observed, numbers of flathead catfish captured, and mean numbers of flathead catfish collected per 3-min sample (C/f) $\pm$ SEs.

Reservoir	Chase boat used?	Capture efficiency		C/f
		Observed	Captured	
Fort Gibson	Yes	111	62	3.1 ± 0.48
	No	103	60	3 ± 0.52
Hudson	Yes	56	25	1.25 ± 0.44
	No	71	37	1.85 ± 0.6
Robert S. Kerr	Yes	96	53	2.65 ± 0.89
	No	95	50	2.5 ± 0.67

and the chi-square test of homogeneity was used to determine if the two sampling methods had similar capture efficiencies. Catch rate (C/f) was expressed as the number of fish netted per 3-min sample, and the paired-sample t-test was used to determine if C/f differed between sampling methods. Length-frequency distributions were established by pooling fish into 5-cm length-classes, and the Kolmogorov–Smirnov two-sample test (KS) was used to compare results between methods. Statistical significance of results was assessed at α equal to 0.05.

Results and Discussion

The percentage of fish observed that were also netted ranged from 45% to 56% with a chase boat and from 52% to 58% without a chase boat on the three reservoirs (Table 2). Both sampling methods provided capture efficiencies typical of other Oklahoma reservoirs (Gilliland 1988; Cunningham 1995, 2000; ODWC, unpublished data). Capture efficiency did not differ significantly with or without a chase boat on Fort Gibson Reservoir ($\chi^2 = 0.125$, df = 1, $P = 0.724$), Hudson Reservoir ($\chi^2 = 0.699$, df = 1, $P = 0.403$), or Robert S. Kerr Reservoir ($\chi^2 = 0.128$, df = 1, $P = 0.721$). Although chase boats may not be necessary in reservoirs, they may be important when sampling rivers because stunned fish often drift downstream unobserved due to river current and turbidity (Stauffer and Koenen 1999).

The mean C/f ($\pm$SE) using a chase boat ranged from 1.25 (0.44) to 3.1 (0.48), and that without a chase boat ranged from 1.85 (0.6) to 3 (0.52; Table 2). The mean C/f did not differ significantly with or without a chase boat on Fort Gibson Reservoir ($W = 0.951$, df = 19, $P = 0.385$), Hudson Reservoir ($W = 0.933$, df = 19, $P = 0.176$), or Robert S. Kerr Reservoir ($W = 0.933$, df = 19, $P = 0.178$). The results of my study contradict the findings of other investigators, which indicate that using a chase boat increases the capture rates of stunned flathead catfish (Gilliland 1988; Quinn 1988). Differences in the densities of flathead catfish between reservoir and river habitats may be a factor. The densities of flathead catfish in my study reservoirs are similar to those found in other Oklahoma reservoirs (Cunningham 1995, 2000; ODWC, unpublished data). However, several authors have documented greater flathead catfish densities in rivers (Quinn 1988; Thomas 1995). Greater densities may increase the likelihood that stunned fish will escape.

The lengths of flathead catfish netted using a chase boat ranged from 133 to 842 mm (Fort Gibson Reservoir), from 250 to 1,000 mm (Hudson Reservoir), and from 101 to 830 mm (Robert S. Kerr Reservoir), and those of fish netted without a chase boat ranged from 180 to 940 mm (Fort Gibson Reservoir), from 210 to 1,020 mm (Hudson Reservoir), and from 121 to 920 mm (Robert S. Kerr Reservoir; Figure 1). Both sampling methods provided length frequencies typical of other Oklahoma reservoirs (Weeks and Combs 1981; Gilliland 1988; ODWC, unpublished data). Length-frequency distributions did not differ significantly with or without a chase boat on Fort Gibson Reservoir (KS = 0.1, $P = 0.172$), Hudson Reservoir (KS = 0.08, $P = 0.809$), or Robert S. Kerr Reservoir (KS = 0.08, $P = 0.538$).

The results of this study suggest that chase boats are not necessary for flathead catfish electrofishing surveys on reservoirs similar to the Fort Gibson, Hudson, and Robert S. Kerr reservoirs. Eliminating chase boats reduces equipment and person hours required to assess flathead catfish populations. These results may also apply to populations in stream or river habitats with slow current and densities similar to those I observed.

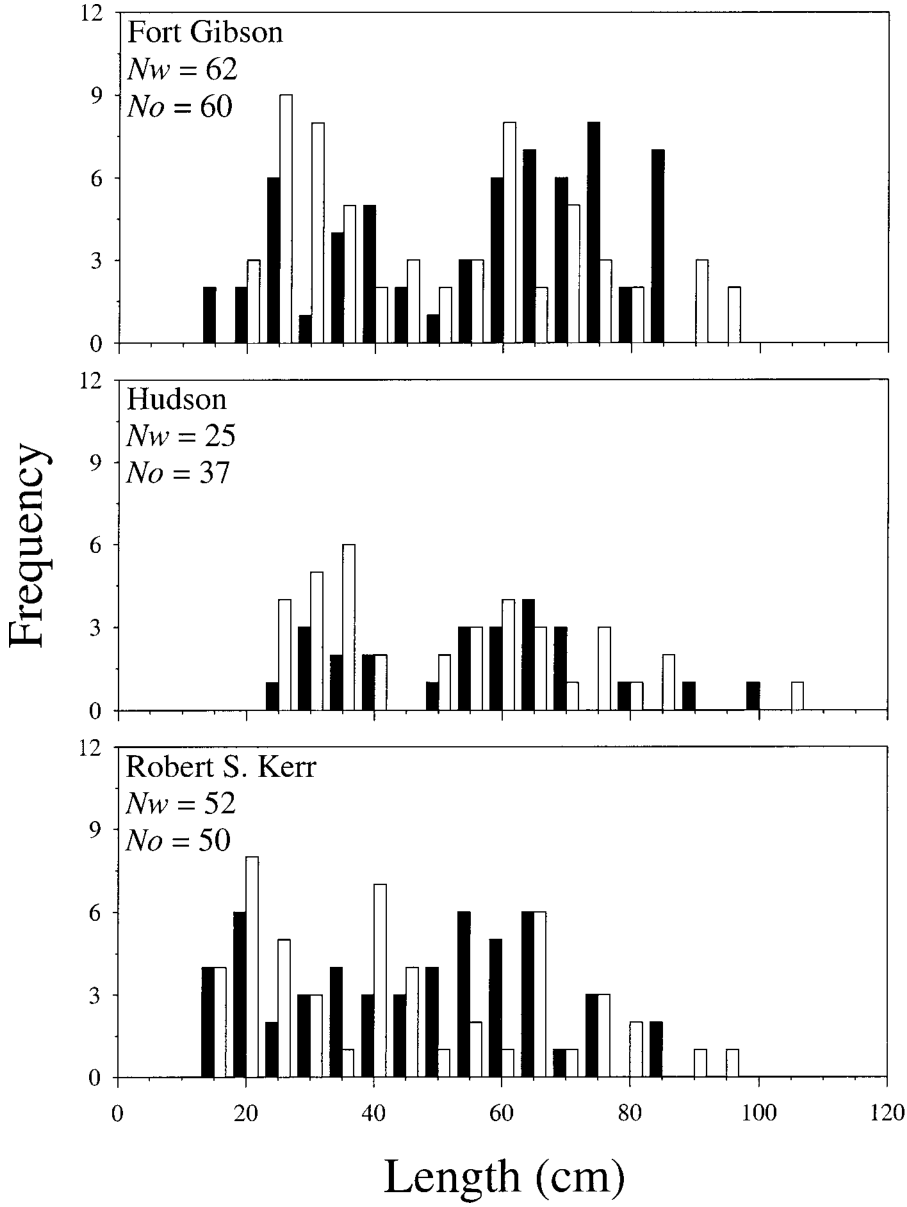

FIGURE 1.—Length frequency distributions (*N*) of flathead catfish collected by electrofishing with a chase boat (solid bars) and without a chase boat (open bars) from Fort Gibson, Hudson, and Robert S. Kerr reservoirs, Oklahoma, 1997. The variables N_w and N_o are the sample sizes for electrofishing with and without a chase boat, respectively.

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